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**Effect of Charge Inversion on Nanoconfined Flow of Multivalent Electrolyte Solutions**[1] ANDRES ROJANO, ANDRES CORDOBA, Universidad de Concepcion, JENS HONORE WALTHER, Technical University of Denmark, HARVEY A. ZAMBRANO, Universidad Tecnica Federico Santa Maria — Miniaturized devices integrated by nanoconduits have great potential for clinical and biotechnological analysis due to amplified sensibility, faster response and increased portability. The transport properties of an electrolyte solution flowing through a nanoconduit in which the electrical double layer occupies a considerable part of the cross section can be altered by the interfacial charge inversion (CI). Hence, an exhaustive understanding of the fluid transport in presence of CI is essential to develop more efficient nanofluidic devices. Here, molecular dynamics simulations of multivalent electrolyte solutions in silica nanochannels are conducted to study the effect of CI on hydrodynamic properties. The solutions consist of water as solvent, chlorine as co-ion and different shares of counter-ions i.e. sodium, magnesium and aluminum. From atomistic trajectories, we find that the magnitude of the effective viscosity is correlated to the concentration and valence of the counter-ions in the solution. Additionally, we show that the CI value is directly related to the hydration shell size of the counter-ions. Moreover, the results suggest that higher CI produces a gel-like region adjacent to the channel wall that increases the interfacial viscosity and friction coefficient.

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Andres Rojano
Universidad de Concepcion

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